

What is claimed is:

1. An ink-jet recording method using an ink set for forming an image on an ink-jet recording medium, wherein:

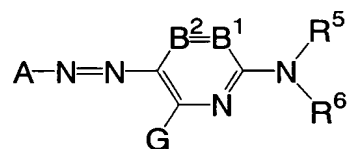
the ink-jet recording medium comprises a support and an ink-receiving layer which comprises a sulfur-containing compound and is disposed on the support;

the ink set comprises a yellow ink comprising a yellow dye, a magenta ink comprising a magenta dye, and a cyan ink comprising a cyan dye; and

the magenta dye has an oxidation potential of higher than 0.8 V (vs SCE).

2. The ink-jet recording method of claim 1, wherein the magenta dye is represented by the following formula (M-I):

Formula (M-I)

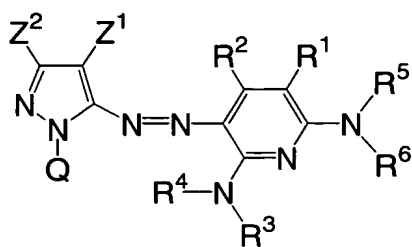


wherein A represents a residue of a 5-membered heterocyclic diazo component A-NH₂; B¹ and B² represent -CR¹= and -CR²=, or alternatively one of B¹ and B² represents a nitrogen atom and the other represents -CR¹= or -CR²=; R⁵ and R⁶ each independently represent one

selected from the group consisting of a hydrogen atom, aliphatic groups, aromatic groups, heterocyclic groups, acyl groups, alkoxycarbonyl groups, aryloxy carbonyl groups, carbamoyl groups, alkyl or aryl sulfonyl groups, and sulfamoyl groups, and the groups may have a substituent; G, R¹ and R² each independently represent one selected from the group consisting of a hydrogen atom, halogen atoms, aliphatic groups, aromatic groups, heterocyclic groups, a cyano group, a carboxyl group, carbamoyl groups, alkoxycarbonyl groups, aryloxy carbonyl groups, heterocyclyloxy carbonyl groups, acyl groups, a hydroxy group, alkoxy groups, aryloxy groups, heterocyclyloxy groups, silyloxy groups, acyloxy groups, carbamoyloxy groups, alkoxycarbonyloxy groups, aryloxy carbonyloxy groups, amino groups, acylamino groups, ureido groups, sulfamoylamino groups, alkoxycarbonylamino groups, aryloxy carbonylamino groups, alkyl or aryl sulfonylamino groups, heterocyclylsulfonylamino groups, a nitro group, alkyl or aryl thio groups, alkyl or aryl sulfonyl groups, heterocyclylsulfonyl groups, alkyl or aryl sulfinyl groups, heterocyclylsulfinyl groups, sulfamoyl groups, a sulfo group, and heterocyclylthio groups, and the groups may have a substituent; and R¹ and R⁵, or R⁵ and R⁶ may bond together to form a 5- or 6-membered ring.

3. The ink-jet recording method of claim 1, wherein the magenta dye is represented by the following formula (M-II):

Formula (M-II)



wherein Z^1 represents an electron-withdrawing group having a Hammett's substituent constant σ_p of 0.20 or more; Z^2 represents a hydrogen atom, an aliphatic group, an aromatic group, or a heterocyclic group; R^1 and R^2 each independently represent one selected from the group consisting of a hydrogen atom, halogen atoms, aliphatic groups, aromatic groups, heterocyclic groups, a cyano group, a carboxyl group, carbamoyl groups, alkoxycarbonyl groups, aryloxycarbonyl groups, heterocyclyloxycarbonyl groups, acyl groups, a hydroxy group, alkoxy groups, aryloxy groups, heterocyclyloxy groups, silyloxy groups, acyloxy groups, carbamoyloxy groups, alkoxycarbonyloxy groups, aryloxycarbonyloxy groups, amino groups, acylamino groups, ureido groups, sulfamoylamino groups, alkoxycarbonylamino groups, aryloxycarbonylamino groups, alkyl or aryl sulfonylamino groups, heterocyclylsulfonylamino groups, a nitro group, alkyl or aryl thio groups, alkyl or aryl sulfonyl groups, heterocyclylsulfonyl groups, alkyl or aryl sulfinyl groups, heterocyclylsulfinyl groups, sulfamoyl groups, a sulfo group, and heterocyclylthio groups, and the groups may have a substituent; R^3 and R^4 each independently represent one selected from

the group consisting of a hydrogen atom, aliphatic groups, aromatic groups, heterocyclic groups, acyl groups, alkoxycarbonyl groups, aryloxy carbonyl groups, carbamoyl groups, alkyl or aryl sulfonyl groups, and sulfamoyl groups; R^5 and R^6 each independently represent one selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, an acyl group, an alkoxycarbonyl group, an aryloxy carbonyl group, a carbamoyl group, an alkyl or aryl sulfonyl group, and a sulfamoyl group, and the groups may have a substituent; and Q represents a hydrogen atom, an aliphatic group, an aromatic group, or a heterocyclic group.

4. The ink-jet recording method of claim 3, wherein Z^1 is one selected from the group consisting of acyl groups having 2 to 20 carbon atoms, alkyloxy carbonyl groups having 2 to 20 carbon atoms, a nitro group, a cyano group, alkylsulfonyl groups having 1 to 20 carbon atoms, arylsulfonyl groups having 6 to 20 carbon atoms, carbamoyl groups having 1 to 20 carbon atoms, and halogenated alkyl groups having 1 to 20 carbon atoms.

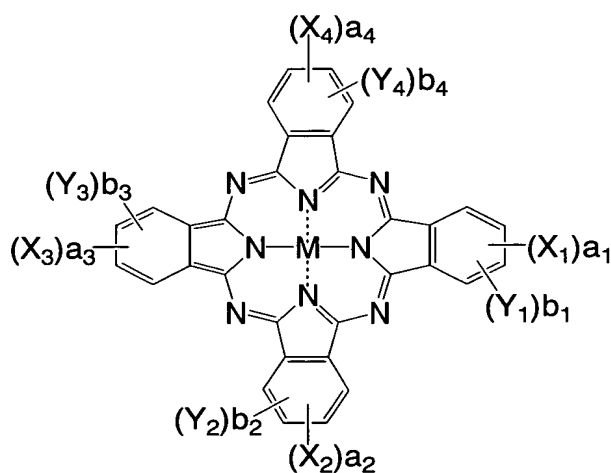
5. The ink-jet recording method of claim 1, wherein the sulfur-containing compound is at least one selected from the group consisting of thioether compounds, thiourea compounds, sulfoxide compounds, thiocyanic acid compounds, sulfinic acid compounds, disulfide compounds, and sulfur-containing heterocyclic compounds.

6. The ink-jet recording method of claim 1, wherein the cyan dye has an oxidation potential of higher than 0.8 V (vs SCE).

7. The ink-jet recording method of claim 6, wherein the sulfur-containing compound is at least one selected from the group consisting of thioether compounds, thiourea compounds, sulfoxide compounds, thiocyanic acid compounds, sulfinic acid compounds, disulfide compounds, and sulfur-containing heterocyclic compounds.

8. The ink-jet recording method of claim 1, wherein the cyan dye is represented by the following formula (C-I):

Formula (C-I)



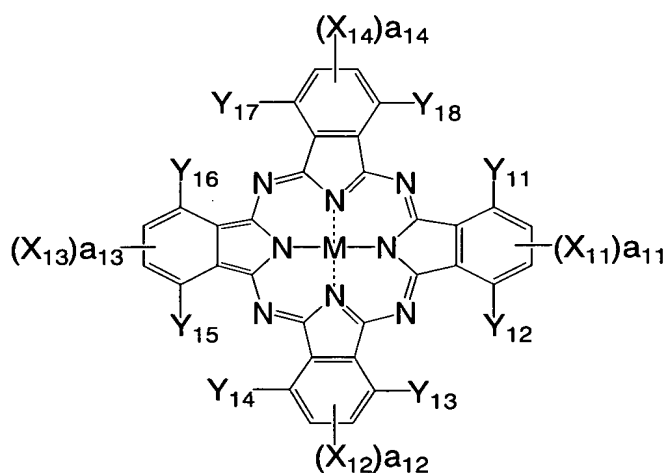
wherein X_1 , X_2 , X_3 and X_4 each independently represent an electron-withdrawing group having a Hammett's substituent constant σ_p of 0.40 or more; Y_1 , Y_2 , Y_3 and Y_4 each independently represent a monovalent substituent; M represents a hydrogen atom, a metal atom, an oxide of a

metal atom, a hydroxide of a metal atom, or a halide of a metal atom; a_1 to a_4 and b_1 to b_4 are the numbers of X_1 to X_4 and Y_1 to Y_4 respectively; a_1 to a_4 each independently represent an integer from 0 to 4; b_1 to b_4 each independently represent an integer from 0 to 4; and the sum of a_1 to a_4 is 2 or more.

9. The ink-jet recording method of claim 8, wherein a_1 to a_4 satisfy $a_1=a_2=a_3=a_4=1$.

10. The ink-jet recording method of claim 1, wherein the cyan dye is represented by the following formula (C-II):

Formula (C-II)



wherein X_{11} to X_{14} each independently represent $-\text{SO}-\text{Z}$, $-\text{SO}_2-\text{Z}$, $-\text{SO}_2\text{NR}_1\text{R}_2$, a sulfo group, $-\text{CONR}_1\text{R}_2$, or $-\text{CO}_2\text{R}_1$; Y_{11} to Y_{18} each independently represent a monovalent substituent; M represents a hydrogen atom, a metal atom, an oxide of a metal atom, a hydroxide of

a metal atom, or a halide of a metal atom; a_{11} to a_{14} are the numbers of X_{11} to X_{14} respectively and each independently represent 1 or 2; Z independently represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic group; and R_1 and R_2 each independently represent a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic group.

11. The ink-jet recording method of claim 10, wherein a_{11} to a_{14} satisfy $4 \leq a_{11} + a_{12} + a_{13} + a_{14} \leq 6$.

12. The ink-jet recording method of claim 10, wherein Y_{11} to Y_{18} each independently represent one selected from the group consisting of a hydrogen atom, halogen atoms, alkyl groups, aryl groups, a cyano group, alkoxy groups, amide groups, ureido groups, sulfonamide groups, carbamoyl groups, sulfamoyl groups, alkoxycarbonyl groups, a carboxyl group, and a sulfo group.

13. The ink-jet recording method of claim 10, wherein M is one selected from the group consisting of Cu, Ni, Zn, and Al.

14. The ink-jet recording method of claim 1, wherein the ink-receiving layer comprises particles, and the inks are absorbed into spaces between the particles.

15. The ink-jet recording method of claim 1, wherein the ink-receiving layer comprises water-soluble resin, and the inks are absorbed into the water-soluble resin.

16. The ink-jet recording method of claim 1, wherein the ink-receiving layer comprises a mordant.

17. The ink-jet recording method of claim 1, wherein a surface of the ink-receiving layer has a pH value of 3 to 8.